

SEQUENCE LISTING

<110> Meyers, Rachel
Cook, William James
Williamson, Mark
Rudolph-Owen, Laura A.
Gimeno, Ruth

<120> 32142, 21481, 25964, 21686, NOVEL DEHYDROGENASE
MOLECULES AND USES THEREFOR

<130> MNI-134CP2

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<150> 09/816,760

<151> 2001-03-23

<150> 09/634,955

<151> 2000-08-08

<150> 60/192,002

<151> 2000-03-24

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<170> PatentIn Ver. 2.0

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tcg	ctg	gag	tac	gga	ccg	gtg	ccg	gag	agc	cac	gca	tgc	gca	ctg	gcc	155
Ser	Leu	Glu	Tyr	Gly	Pro	Val	Pro	Glu	Ser	His	Ala	Cys	Ala	Leu	Ala	
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tgg	ctg	gac	acc	cag	gac	cgg	tgc	ttg	ggc	cac	tat	gtg	aat	ggg	aag	203
Trp	Leu	Asp	Thr	Gln	Asp	Arg	Cys	Leu	Gly	His	Tyr	Val	Asn	Gly	Lys	
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tgg	tta	aag	cct	gaa	cac	aga	aat	tca	gtg	cct	tgc	cag	gat	ccc	atc	251
Trp	Leu	Lys	Pro	Glu	His	Arg	Asn	Ser	Val	Pro	Cys	Gln	Asp	Pro	Ile	
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gct gca gcc gtg gag gca gcc agg atg gca ttt aag ggc tgg agt gcg 347
 Ala Ala Ala Val Glu Ala Ala Arg Met Ala Phe Lys Gly Trp Ser Ala
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cac ccc ggc gtc gtc cgg gcc cag cac ctg acc agg ctg gcc gag gtg 395
 His Pro Gly Val Val Arg Ala Gln His Leu Thr Arg Leu Ala Glu Val
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atc cag aag cac cag cgg ctg ctg tgg acc ctg gaa tcc ctg gtg act 443
 Ile Gln Lys His Gln Arg Leu Leu Trp Thr Leu Glu Ser Leu Val Thr
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cag ctg ctc cac tac cat gca atc cag gca tcc acc cag gag gag gca 539
 Gln Leu Leu His Tyr His Ala Ile Gln Ala Ser Thr Gln Glu Glu Ala
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ctg gca ggc tgg gag ccc atg gga gta att ggc ctc atc ctg cca ccc 587
 Leu Ala Gly Trp Glu Pro Met Gly Val Ile Gly Leu Ile Leu Pro Pro
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 Thr Phe Ser Phe Leu Glu Met Met Trp Arg Ile Cys Pro Ala Leu Ala
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ctc ctc ctg gcc cag ctg gcg ggg gag ctg ggc ccc ttc ccg gga atc 731
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cgt gcc ctt cga cgg agc ctg gcg gga gag tgt gcg gag ctg ggc ctg 875
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 Asp Ser Ala Val Glu Gly Val Val Asp Ala Ala Trp Ser Asp Arg Gly
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ccg ggt ggc ctc agg ctc ctc atc cag gag tct gtg tgg gat gaa gcc 1019
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ctg gat ggg gcc gtg gac atg ggg gcc cgg ggg gct gcc gca tgt gac 1115
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 Phe Gln Ala Gly Asp Val Pro Ser Glu Arg Pro Phe Tyr Pro Pro Thr
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agc gag agg ctg ggg cag gcg ctg gag ctg ggc tat ggg ctc cag gtg 1403
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ggc act gtc tgg atc aac gcc cac ggc ctc aga gac cct tcg gtg ccc 1451
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 Cys Leu Ser Lys Asn Leu Asn Tyr Asp Thr Phe Gly Leu Ala Val Pro
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tca acc ctg ccg gct ggg cct gaa ata ggg ccc agc cca gca ccc ccc 1643
 Ser Thr Leu Pro Ala Gly Pro Glu Ile Gly Pro Ser Pro Ala Pro Pro
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 Tyr Gly Leu Phe Val Gly Gly Arg Phe Gln Ala Pro Gly Ala Arg Ser
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Leu Trp Ala Leu Ala Ala Ala Leu Glu Arg Arg Lys Ser Thr Leu Ala	
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Trp Pro Leu Leu Ala Phe Val Ser Leu Leu Ala Pro Ala Leu Ala Tyr	
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Gly Asn Thr Val Val Met Val Pro Ser Ala Ala Cys Pro Leu Leu Ala	
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ctg gag gtc tgc cag gac atg gcc acc gtg ttc cca gca ggc ctg gcc	2219
Leu Glu Val Cys Gln Asp Met Ala Thr Val Phe Pro Ala Gly Leu Ala	
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aac gtg gtg aca gga gac cgg gac cat ctg acc cgc tgc ctg gcc ttg	2267
Asn Val Val Thr Gly Asp Arg Asp His Leu Thr Arg Cys Leu Ala Leu	
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cac caa gac gtc cag gcc atg tgg tat ttc gga tca gcc cag ggt tcc	2315
His Gln Asp Val Gln Ala Met Trp Tyr Phe Gly Ser Ala Gln Gly Ser	
740 745 750	
cag ttt gtc gag tgg gcc tcc gca gga aac ctc aaa ccg gtg tgg gcg	2363
Gln Phe Val Glu Trp Ala Ser Ala Gly Asn Leu Lys Pro Val Trp Ala	
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Ser Arg Gly Cys Pro Arg Ala Trp Asp Gln Glu Ala Glu Gly Ala Gly	
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Pro Glu Leu Gly Leu Arg Val Ala Arg Thr Lys Ala Leu Trp Leu Pro
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Met Gly Asp
800

accaagggga gatgcacccc acagacacct gggactttcc ctttctggtt cctgtgtctc 2568

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Leu Lys Pro Glu His Arg Asn Ser Val Pro Cys Gln Asp Pro Ile Thr
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Gly Glu Asn Leu Ala Ser Cys Leu Gln Ala Gln Ala Glu Asp Val Ala
65 70 75 80

Ala Ala Val Glu Ala Ala Arg Met Ala Phe Lys Gly Trp Ser Ala His
85 90 95

Pro Gly Val Val Arg Ala Gln His Leu Thr Arg Leu Ala Glu Val Ile
100 105 110

Gln Lys His Gln Arg Leu Leu Trp Thr Leu Glu Ser Leu Val Thr Gly
115 120 125

Arg Ala Val Arg Glu Val Arg Asp Gly Asp Val Gln Leu Ala Gln Gln
130 135 140

Leu Leu His Tyr His Ala Ile Gln Ala Ser Thr Gln Glu Glu Ala Leu
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Ala Gly Trp Glu Pro Met Gly Val Ile Gly Leu Ile Leu Pro Pro Thr
165 170 175

Phe Ser Phe Leu Glu Met Met Trp Arg Ile Cys Pro Ala Leu Ala Val
180 185 190

Gly Cys Thr Val Val Ala Leu Val Pro Pro Ala Ser Pro Ala Pro Leu
195 200 205

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Asn Val Val Ser Gly Pro Ala Ser Leu Val Pro Ile Leu Ala Ser Gln
 225 230 235 240

Pro Gly Ile Arg Lys Val Ala Phe Cys Gly Ala Pro Glu Glu Gly Arg
 245 250 255

Ala Leu Arg Arg Ser Leu Ala Gly Glu Cys Ala Glu Leu Gly Leu Ala
 260 265 270

Leu Gly Thr Glu Ser Leu Leu Leu Leu Thr Asp Thr Ala Asp Val Asp
 275 280 285

Ser Ala Val Glu Gly Val Val Asp Ala Ala Trp Ser Asp Arg Gly Pro
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Gly Gly Leu Arg Leu Leu Ile Gln Glu Ser Val Trp Asp Glu Ala Met
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Arg Arg Leu Gln Glu Arg Met Gly Arg Leu Arg Ser Gly Arg Gly Leu
 325 330 335

Asp Gly Ala Val Asp Met Gly Ala Arg Gly Ala Ala Ala Cys Asp Leu
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Val Gln Arg Phe Val Arg Glu Ala Gln Ser Gln Gly Ala Gln Val Phe
 355 360 365

Gln Ala Gly Asp Val Pro Ser Glu Arg Pro Phe Tyr Pro Pro Thr Leu
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Trp Pro Val Val Val Ala Ser Pro Phe Arg Thr Ala Lys Glu Ala Leu
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Glu Arg Leu Gly Gln Ala Leu Glu Leu Gly Tyr Gly Leu Gln Val Gly
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Thr Val Trp Ile Asn Ala His Gly Leu Arg Asp Pro Ser Val Pro Thr
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Leu Tyr Glu Tyr Leu Arg Pro Ser Gly Thr Pro Ala Arg Leu Ser Cys
 485 490 495

Leu Ser Lys Asn Leu Asn Tyr Asp Thr Phe Gly Leu Ala Val Pro Ser
 500 505 510

Thr Leu Pro Ala Gly Pro Glu Ile Gly Pro Ser Pro Ala Pro Pro Tyr
 515 520 525

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Gly Leu Phe Val Gly Gly Arg Phe Gln Ala Pro Gly Ala Arg Ser Ser
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Arg Pro Ile Arg Asp Ser Ser Gly Asn Leu His Gly Tyr Val Ala Glu
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Gly Gly Ala Lys Asp Ile Arg Gly Ala Val Glu Ala Ala His Gln Ala
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Phe Pro Gly Trp Ala Gly Gln Ser Pro Gly Ala Arg Ala Ala Leu Leu
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Trp Ala Leu Ala Ala Ala Leu Glu Arg Arg Lys Ser Thr Leu Ala Ser
595 600 605

Arg Leu Glu Arg Gln Gly Ala Glu Leu Lys Ala Ala Glu Ala Glu Val
610 615 620

Glu Leu Ser Ala Arg Arg Leu Arg Ala Trp Gly Ala Arg Val Gln Ala
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Gln Gly His Thr Leu Gln Val Ala Gly Leu Arg Gly Pro Val Leu Arg
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Leu Arg Glu Pro Leu Gly Val Leu Ala Val Val Cys Pro Asp Glu Trp
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Pro Leu Leu Ala Phe Val Ser Leu Leu Ala Pro Ala Leu Ala Tyr Gly
675 680 685

Asn Thr Val Val Met Val Pro Ser Ala Ala Cys Pro Leu Leu Ala Leu
690 695 700

Glu Val Cys Gln Asp Met Ala Thr Val Phe Pro Ala Gly Leu Ala Asn
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Val Val Thr Gly Asp Arg Asp His Leu Thr Arg Cys Leu Ala Leu His
725 730 735

Gln Asp Val Gln Ala Met Trp Tyr Phe Gly Ser Ala Gln Gly Ser Gln
740 745 750

Phe Val Glu Trp Ala Ser Ala Gly Asn Leu Lys Pro Val Trp Ala Ser
755 760 765

Arg Gly Cys Pro Arg Ala Trp Asp Gln Glu Ala Glu Gly Ala Gly Pro
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Leu Asp Thr Gln Asp Arg Cys Leu Gly His Tyr Val Asn Gly Lys Trp	
35 40 45	
tta aag cct gaa cac aga aat tca gtg cct tgc cag gat ccc atc aca	192
Leu Lys Pro Glu His Arg Asn Ser Val Pro Cys Gln Asp Pro Ile Thr	
50 55 60	
gga gag aac ttg gcc agt tgc ctg cag gca cag gcc gag gat gtg gct	240
Gly Glu Asn Leu Ala Ser Cys Leu Gln Ala Gln Ala Glu Asp Val Ala	
65 70 75 80	
gca gcc gtg gag gca gcc agg atg gca ttt aag ggc tgg agt gcg cac	288
Ala Ala Val Glu Ala Ala Arg Met Ala Phe Lys Gly Trp Ser Ala His	
85 90 95	
ccc ggc gtc gtc cgg gcc cag cac ctg acc agg ctg gcc gag gtg atc	336
Pro Gly Val Val Arg Ala Gln His Leu Thr Arg Leu Ala Glu Val Ile	
100 105 110	
cag aag cac cag cgg ctg ctg tgg acc ctg gaa tcc ctg gtg act ggg	384
Gln Lys His Gln Arg Leu Leu Trp Thr Leu Glu Ser Leu Val Thr Gly	
115 120 125	
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Arg Ala Val Arg Glu Val Arg Asp Gly Asp Val Gln Leu Ala Gln Gln	
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Leu Leu His Tyr His Ala Ile Gln Ala Ser Thr Gln Glu Glu Ala Leu	
145 150 155 160	
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Ala Gly Trp Glu Pro Met Gly Val Ile Gly Leu Ile Leu Pro Pro Thr	
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Phe Ser Phe Leu Glu Met Met Trp Arg Ile Cys Pro Ala Leu Ala Val	
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Gly Cys Thr Val Val Ala Leu Val Pro Pro Ala Ser Pro Ala Pro Leu	
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Leu Leu Ala Gln Leu Ala Gly Glu Leu Gly Pro Phe Pro Gly Ile Leu	
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Asn Val Val Ser Gly Pro Ala Ser Leu Val Pro Ile Leu Ala Ser Gln	
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Pro Gly Ile Arg Lys Val Ala Phe Cys Gly Ala Pro Glu Glu Gly Arg	
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Ala Leu Arg Arg Ser Leu Ala Gly Glu Cys Ala Glu Leu Gly Leu Ala	
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Leu Gly Thr Glu Ser Leu Leu Leu Thr Asp Thr Ala Asp Val Asp	
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Arg Arg Leu Gln Glu Arg Met Gly Arg Leu Arg Ser Gly Arg Gly Leu	
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Asp Gly Ala Val Asp Met Gly Ala Arg Gly Ala Ala Ala Cys Asp Leu	
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Gln Ala Gly Asp Val Pro Ser Glu Arg Pro Phe Tyr Pro Pro Thr Leu	
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Trp Pro Val Val Val Ala Ser Pro Phe Arg Thr Ala Lys Glu Ala Leu	
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ccc ctg ctt gcc ttc gtg tcc ctg ctg gct ccc gcc ctg gcc tac ggc Pro Leu Leu Ala Phe Val Ser Leu Leu Ala Pro Ala Leu Ala Tyr Gly 675 680 685	2064
aac act gtg gtc atg gtg ccc agt gcg gcc tgt cct ctg ctg gcc ctg Asn Thr Val Val Met Val Pro Ser Ala Ala Cys Pro Leu Leu Ala Leu 690 695 700	2112

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 705 710 715 720

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 Val Val Thr Gly Asp Arg Asp His Leu Thr Arg Cys Leu Ala Leu His
 725 730 735

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 740 745 750

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 755 760 765

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 Arg Gly Cys Pro Arg Ala Trp Asp Gln Glu Ala Glu Gly Ala Gly Pro
 770 775 780

gag ctg ggg ctg cga gtg gcg cgg acc aag gcc ctg tgg ctg cct atg 2400
 Glu Leu Gly Leu Arg Val Ala Arg Thr Lys Ala Leu Trp Leu Pro Met
 785 790 795 800

ggg gac 2406
 Gly Asp

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 cccctggatt cggctctgctt tcggagacac tgtgagtaac ttcctatttg ttgaacattt 180
 ggggattagc acgcccactg ggtgttcagc ttggaggctt gcacagagct gagctccctg 240
 cagccttggg cctccccctg ccctgggagt cctgatcagc gtctctttgc aaagccaatc 300
 cccttttact ccgttgctcc ccagaacaag atg gga gtc atg gcc atg ctg atg 354
 Met Gly Val Met Ala Met Leu Met
 1 5

ctc ccc ctg ctg ctg ctg gga atc agc ggc ctc ctc ttc att tac caa 402
 Leu Pro Leu Leu Leu Leu Gly Ile Ser Gly Leu Leu Phe Ile Tyr Gln
 10 15 20

- 12 -

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Glu Val Ser Arg Leu Trp Ser Lys Ser Ala Val Gln Asn Lys Val Val	
25 30 35 40	
gtg atc acc gat gcc atc tca gga ctg ggc aag gag tgt gct cgg gtg	498
Val Ile Thr Asp Ala Ile Ser Gly Leu Gly Lys Glu Cys Ala Arg Val	
45 50 55	
ttc cac aca ggt ggg gca agg ctg gtg ctg tgt gga aag aac tgg gag	546
Phe His Thr Gly Gly Ala Arg Leu Val Leu Cys Gly Lys Asn Trp Glu	
60 65 70	
agg cta gag aac cta tat gat gcc ttg atc agc gtg gct gac ccc agc	594
Arg Leu Glu Asn Leu Tyr Asp Ala Leu Ile Ser Val Ala Asp Pro Ser	
75 80 85	
aag aca ttc acc cca aag ctg gtc ctg ttg gac ctc tca gac atc agc	642
Lys Thr Phe Thr Pro Lys Leu Val Leu Leu Asp Leu Ser Asp Ile Ser	
90 95 100	
tgt gtc cca gat gtg gca aaa gaa gtc ctg gat tgc tat ggc tgt gtg	690
Cys Val Pro Asp Val Ala Lys Glu Val Leu Asp Cys Tyr Gly Cys Val	
105 110 115 120	
gac atc ctc atc aac aat gcc agt gtg aag gtg aag ggg cct gcc cat	738
Asp Ile Leu Ile Asn Asn Ala Ser Val Lys Val Lys Gly Pro Ala His	
125 130 135	
aag att tct ctg gag ctc gac aaa aag atc atg gat gcc aat tac ttt	786
Lys Ile Ser Leu Glu Leu Asp Lys Lys Ile Met Asp Ala Asn Tyr Phe	
140 145 150	
ggc ccc atc aca ttg acg aaa gcc ctg ctt ccc aac atg atc tcc cgg	834
Gly Pro Ile Thr Leu Thr Lys Ala Leu Leu Pro Asn Met Ile Ser Arg	
155 160 165	
aga aca ggc caa atc gtg tta gtg aat aat atc caa ggg aag ttt gga	882
Arg Thr Gly Gln Ile Val Leu Val Asn Asn Ile Gln Gly Lys Phe Gly	
170 175 180	
atc ccg ttc cgt acg act tac gct gcc tcc aag cac gca gcc ctg ggc	930
Ile Pro Phe Arg Thr Thr Tyr Ala Ala Ser Lys His Ala Ala Leu Gly	
185 190 195 200	
ttc ttt gac tgc ctc cga gcc gaa gtg gag gaa tac gat gtt gtc atc	978
Phe Phe Asp Cys Leu Arg Ala Glu Val Glu Glu Tyr Asp Val Val Ile	
205 210 215	
agc acc gtg agc ccg act ttc atc cgg tgc tac cac gtg tat cca gag	1026
Ser Thr Val Ser Pro Thr Phe Ile Arg Ser Tyr His Val Tyr Pro Glu	
220 225 230	
caa gga aac tgg gaa gct tcc att tgg aaa ttc ttt ttc agg aag ctg	1074
Gln Gly Asn Trp Glu Ala Ser Ile Trp Lys Phe Phe Arg Lys Leu	
235 240 245	
acc tac ggc gtg cac cca gta gag gtg gcg gag gag gtg atg cgc acc	1122
Thr Tyr Gly Val His Pro Val Glu Val Ala Glu Glu Val Met Arg Thr	
250 255 260	

- 13 -

gtg cgg agg aag aag caa gag gtg ttt atg gcc aac ccc atc ccc aag 1170
Val Arg Arg Lys Lys Gln Glu Val Phe Met Ala Asn Pro Ile Pro Lys
265 270 275 280

gcc gcc gtg tac gtc cgc acc ttc ttc ccg gag ttc ttt ttc gcc gtg 1218
Ala Ala Val Tyr Val Arg Thr Phe Phe Pro Glu Phe Phe Phe Ala Val
285 290 295

gtg gcc tgt ggg gtg aag gag aag ctc aat gtc ccg gag gag ggg 1263
Val Ala Cys Gly Val Lys Glu Lys Leu Asn Val Pro Glu Glu Gly
300 305 310

taactgcagg aggccaaatg ggccaccctc tggaataaaa ggtttttctg gcaaaaaaaaa 1323

aaaaaaaaaa aaantttgcg gccgcaagct tattcccttt agggagggtt aatttt 1379

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<213> Homo sapiens

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35 40 45

Leu Gly Lys Glu Cys Ala Arg Val Phe His Thr Gly Gly Ala Arg Leu
50 55 60

Val Leu Cys Gly Lys Asn Trp Glu Arg Leu Glu Asn Leu Tyr Asp Ala
65 70 75 80

Leu Ile Ser Val Ala Asp Pro Ser Lys Thr Phe Thr Pro Lys Leu Val
85 90 95

Leu Leu Asp Leu Ser Asp Ile Ser Cys Val Pro Asp Val Ala Lys Glu
100 105 110

Val Leu Asp Cys Tyr Gly Cys Val Asp Ile Leu Ile Asn Asn Ala Ser
115 120 125

Val Lys Val Lys Gly Pro Ala His Lys Ile Ser Leu Glu Leu Asp Lys
130 135 140

Lys Ile Met Asp Ala Asn Tyr Phe Gly Pro Ile Thr Leu Thr Lys Ala
145 150 155 160

Leu Leu Pro Asn Met Ile Ser Arg Arg Thr Gly Gln Ile Val Leu Val
165 170 175

Asn Asn Ile Gln Gly Lys Phe Gly Ile Pro Phe Arg Thr Thr Tyr Ala
180 185 190

Ala Ser Lys His Ala Ala Leu Gly Phe Phe Asp Cys Leu Arg Ala Glu
195 200 205

- 14 -

Val Glu Glu Tyr Asp Val Val Ile Ser Thr Val Ser Pro Thr Phe Ile
 210 215 220
 Arg Ser Tyr His Val Tyr Pro Glu Gln Gly Asn Trp Glu Ala Ser Ile
 225 230 235 240
 Trp Lys Phe Phe Phe Arg Lys Leu Thr Tyr Gly Val His Pro Val Glu
 245 250 255
 Val Ala Glu Glu Val Met Arg Thr Val Arg Arg Lys Lys Gln Glu Val
 260 265 270
 Phe Met Ala Asn Pro Ile Pro Lys Ala Ala Val Tyr Val Arg Thr Phe
 275 280 285
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 290 295 300
 Leu Asn Val Pro Glu Glu Gly
 305 310

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 agc ggc ctc ctc ttc att tac caa gag gtg tcc agg ctg tgg tca aag 96
 Ser Gly Leu Leu Phe Ile Tyr Gln Glu Val Ser Arg Leu Trp Ser Lys
 20 25 30
 tca gct gtg cag aac aaa gtg gtg gtg atc acc gat gcc atc tca gga 144
 Ser Ala Val Gln Asn Lys Val Val Val Ile Thr Asp Ala Ile Ser Gly
 35 40 45
 ctg ggc aag gag tgt gct cgg gtg ttc cac aca ggt ggg gca agg ctg 192
 Leu Gly Lys Glu Cys Ala Arg Val Phe His Thr Gly Gly Ala Arg Leu
 50 55 60
 gtg ctg tgt gga aag aac tgg gag agg cta gag aac cta tat gat gcc 240
 Val Leu Cys Gly Lys Asn Trp Glu Arg Leu Glu Asn Leu Tyr Asp Ala
 65 70 75 80
 ttg atc agc gtg gct gac ccc agc aag aca ttc acc cca aag ctg gtc 288
 Leu Ile Ser Val Ala Asp Pro Ser Lys Thr Phe Thr Pro Lys Leu Val
 85 90 95
 ctg ttg gac ctc tca gac atc agc tgt gtc cca gat gtg gca aaa gaa 336
 Leu Leu Asp Leu Ser Asp Ile Ser Cys Val Pro Asp Val Ala Lys Glu
 100 105 110

- 15 -

gtc ctg gat tgc tat ggc tgt gtg gac atc ctc atc aac aat gcc agt 384
Val Leu Asp Cys Tyr Gly Cys Val Asp Ile Leu Ile Asn Asn Ala Ser
115 120 125

gtg aag gtg aag ggg cct gcc cat aag att tct ctg gag ctc gac aaa 432
Val Lys Val Lys Gly Pro Ala His Lys Ile Ser Leu Glu Leu Asp Lys
130 135 140

aag atc atg gat gcc aat tac ttt ggc ccc atc aca ttg acg aaa gcc 480
Lys Ile Met Asp Ala Asn Tyr Phe Gly Pro Ile Thr Leu Thr Lys Ala
145 150 155 160

ctg ctt ccc aac atg atc tcc cgg aga aca ggc caa atc gtg tta gtg 528
Leu Leu Pro Asn Met Ile Ser Arg Arg Thr Gly Gln Ile Val Leu Val
165 170 175

aat aat atc caa ggg aag ttt gga atc ccg ttc cgt acg act tac gct 576
Asn Asn Ile Gln Gly Lys Phe Gly Ile Pro Phe Arg Thr Thr Tyr Ala
180 185 190

gcc tcc aag cac gca gcc ctg ggc ttc ttt gac tgc ctc cga gcc gaa 624
Ala Ser Lys His Ala Ala Leu Gly Phe Phe Asp Cys Leu Arg Ala Glu
195 200 205

gtg gag gaa tac gat gtt gtc atc agc acc gtg agc ccg act ttc atc 672
Val Glu Glu Tyr Asp Val Val Ile Ser Thr Val Ser Pro Thr Phe Ile
210 215 220

cgg tcg tac cac gtg tat cca gag caa gga aac tgg gaa gct tcc att 720
Arg Ser Tyr His Val Tyr Pro Glu Gln Gly Asn Trp Glu Ala Ser Ile
225 230 235 240

tgg aaa ttc ttt ttc agg aag ctg acc tac ggc gtg cac cca gta gag 768
Trp Lys Phe Phe Phe Arg Lys Leu Thr Tyr Gly Val His Pro Val Glu
245 250 255

gtg gcg gag gag gtg atg cgc acc gtg cgg agg aag aag caa gag gtg 816
Val Ala Glu Glu Val Met Arg Thr Val Arg Arg Lys Lys Gln Glu Val
260 265 270

ttt atg gcc aac ccc atc ccc aag gcc gcc gtg tac gtc cgc acc ttc 864
Phe Met Ala Asn Pro Ile Pro Lys Ala Ala Val Tyr Val Arg Thr Phe
275 280 285

ttc ccg gag ttc ttt ttc gcc gtg gtg gcc tgt ggg gtg aag gag aag 912
Phe Pro Glu Phe Phe Phe Ala Val Val Ala Cys Gly Val Lys Glu Lys
290 295 300

ctc aat gtc ccg gag gag ggg 933
Leu Asn Val Pro Glu Glu Gly
305 310

<210> 7

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gacggcaggt ggcttggttg ctgcagctcc caggatcagc tctgccctcc ccgcaaacgc 180
cagcctcgtc accgctccag ggcaacctca gcagtaacag gtggttgag caggtggcag 240
ccagcccctg gatgagccaa ggtctcttcc ccagccaggc atg gcc gac tct gca 295
                                   Met Ala Asp Ser Ala
                                   1           5
cag gcc cag aag ctg gtg tac ctg gtc aca ggg ggc tgt ggc ttc ctg 343
Gln Ala Gln Lys Leu Val Tyr Leu Val Thr Gly Gly Cys Gly Phe Leu
                                   10           15           20
gga gag cac gtg gtg cga atg ctg ctg cag cgg gag ccc cgg ctc ggg 391
Gly Glu His Val Val Arg Met Leu Leu Gln Arg Glu Pro Arg Leu Gly
                                   25           30           35
gag ctg cgg gtc ttt gac caa cac ctg ggt ccc tgg ctg gag gag ctg 439
Glu Leu Arg Val Phe Asp Gln His Leu Gly Pro Trp Leu Glu Glu Leu
                                   40           45           50
aag aca ggg cct gtg agg gtg act gcc atc cag ggg gac gtg acc cag 487
Lys Thr Gly Pro Val Arg Val Thr Ala Ile Gln Gly Asp Val Thr Gln
                                   55           60           65
gcc cat gag gtg gca gca gct gtg gcc gga gcc cat gtg gtc atc cac 535
Ala His Glu Val Ala Ala Val Ala Gly Ala His Val Val Ile His
                                   70           75           80           85
acg gct ggg ctg gta gac gtg ttt ggc agg gcc agt ccc aag acc atc 583
Thr Ala Gly Leu Val Asp Val Phe Gly Arg Ala Ser Pro Lys Thr Ile
                                   90           95           100
cat gag gtc aac gtg cag ggt acc cgg aac gtg atc gag gct tgt gtg 631
His Glu Val Asn Val Gln Gly Thr Arg Asn Val Ile Glu Ala Cys Val
                                   105           110           115
cag acc gga aca cgg ttc ctg gtc tac acc agc agc atg gaa gtt gtg 679
Gln Thr Gly Thr Arg Phe Leu Val Tyr Thr Ser Ser Met Glu Val Val
                                   120           125           130
ggg cct aac acc aaa ggt cac ccc ttc tac agg ggc aac gaa gac acc 727
Gly Pro Asn Thr Lys Gly His Pro Phe Tyr Arg Gly Asn Glu Asp Thr
                                   135           140           145
cca tac gaa gca gtg cac agg cac ccc tat cct tgc agc aag gcc ctg 775
Pro Tyr Glu Ala Val His Arg His Pro Tyr Pro Cys Ser Lys Ala Leu
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gcc gag tgg ctg gtc ctg gag gcc aac ggg agg aag gtc cgt ggg ggg 823
 Ala Glu Trp Leu Val Leu Glu Ala Asn Gly Arg Lys Val Arg Gly Gly
 170 175 180

ctg ccc ctg gtg acg tgt gcc ctt cgt ccc acg ggc atc tac ggt gaa 871
 Leu Pro Leu Val Thr Cys Ala Leu Arg Pro Thr Gly Ile Tyr Gly Glu
 185 190 195

ggc cac cag atc atg agg gac ttc tac cgc cag ggc ctg cgc ctg gga 919
 Gly His Gln Ile Met Arg Asp Phe Tyr Arg Gln Gly Leu Arg Leu Gly
 200 205 210

ggt tgg ctc ttc cgg gcc atc ccg gcc tct gtg gag cat ggc cgg gtc 967
 Gly Trp Leu Phe Arg Ala Ile Pro Ala Ser Val Glu His Gly Arg Val
 215 220 225

tat gtg ggc aat gtt gcc tgg atg cac gtg ctg gca gcc cgg gag ctg 1015
 Tyr Val Gly Asn Val Ala Trp Met His Val Leu Ala Ala Arg Glu Leu
 230 235 240 245

gag cag cgg gca gcc ctg atg ggc ggc cag gta tac ttc tgc tac gat 1063
 Glu Gln Arg Ala Ala Leu Met Gly Gly Gln Val Tyr Phe Cys Tyr Asp
 250 255 260

gga tca ccc tac agg agc tac gag gat ttc aac atg gag ttc ctg ggc 1111
 Gly Ser Pro Tyr Arg Ser Tyr Glu Asp Phe Asn Met Glu Phe Leu Gly
 265 270 275

ccc tgc gga ctg cgg ctg gtg ggc gcc cgc cca ttg ctg ccc tac tgg 1159
 Pro Cys Gly Leu Arg Leu Val Gly Ala Arg Pro Leu Leu Pro Tyr Trp
 280 285 290

ctg ctg gtg ttc ctg gct gcc ctc aat gcc ctg ctg cag tgg ctg ctg 1207
 Leu Leu Val Phe Leu Ala Ala Leu Asn Ala Leu Leu Gln Trp Leu Leu
 295 300 305

cgg cca ctg gtg ctc tac gca ccc ctg ctg aac ccc tac acg ctg gcc 1255
 Arg Pro Leu Val Leu Tyr Ala Pro Leu Leu Asn Pro Tyr Thr Leu Ala
 310 315 320 325

gtg gcc aac acc acc ttc acc gtc agc acc gac aag gct cag cgc cat 1303
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 330 335 340

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 Phe Gly Tyr Glu Pro Leu Phe Ser Trp Glu Asp Ser Arg Thr Arg Thr
 345 350 355

att ctc tgg gta cag gcc gct acg ggt tca gcc cag tgacggtggg 1397
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 360 365

gctggggcct ggaggcccag atacagcaca tccacccagg tcccagagccc tcacaccctg 1457

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tccttgctgt agagccctcc acatttttctt tttctttttt gagacagggt cttgctctgt 1577

caccagact ggaatgcaag tgggtgtgant cataagctca ctngmaccct yaanccttct 1637

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1725

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<212> PRT

<213> Homo sapiens

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Trp Leu Glu Glu Leu Lys Thr Gly Pro Val Arg Val Thr Ala Ile Gln
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Gly Asp Val Thr Gln Ala His Glu Val Ala Ala Ala Val Ala Gly Ala
 65 70 75 80

His Val Val Ile His Thr Ala Gly Leu Val Asp Val Phe Gly Arg Ala
 85 90 95

Ser Pro Lys Thr Ile His Glu Val Asn Val Gln Gly Thr Arg Asn Val
 100 105 110

Ile Glu Ala Cys Val Gln Thr Gly Thr Arg Phe Leu Val Tyr Thr Ser
 115 120 125

Ser Met Glu Val Val Gly Pro Asn Thr Lys Gly His Pro Phe Tyr Arg
 130 135 140

Gly Asn Glu Asp Thr Pro Tyr Glu Ala Val His Arg His Pro Tyr Pro
 145 150 155 160

Cys Ser Lys Ala Leu Ala Glu Trp Leu Val Leu Glu Ala Asn Gly Arg
 165 170 175

Lys Val Arg Gly Gly Leu Pro Leu Val Thr Cys Ala Leu Arg Pro Thr
 180 185 190

Gly Ile Tyr Gly Glu Gly His Gln Ile Met Arg Asp Phe Tyr Arg Gln
 195 200 205

Gly Leu Arg Leu Gly Gly Trp Leu Phe Arg Ala Ile Pro Ala Ser Val
 210 215 220

Glu His Gly Arg Val Tyr Val Gly Asn Val Ala Trp Met His Val Leu
 225 230 235 240

Ala Ala Arg Glu Leu Glu Gln Arg Ala Ala Leu Met Gly Gly Gln Val
 245 250 255

Tyr Phe Cys Tyr Asp Gly Ser Pro Tyr Arg Ser Tyr Glu Asp Phe Asn
 260 265 270

- 19 -

Met Glu Phe Leu Gly Pro Cys Gly Leu Arg Leu Val Gly Ala Arg Pro
275 280 285

Leu Leu Pro Tyr Trp Leu Leu Val Phe Leu Ala Ala Leu Asn Ala Leu
290 295 300

Leu Gln Trp Leu Leu Arg Pro Leu Val Leu Tyr Ala Pro Leu Leu Asn
305 310 315 320

Pro Tyr Thr Leu Ala Val Ala Asn Thr Thr Phe Thr Val Ser Thr Asp
325 330 335

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340 345 350

Ser Arg Thr Arg Thr Ile Leu Trp Val Gln Ala Ala Thr Gly Ser Ala
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Gln

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Gly Cys Gly Phe Leu Gly Glu His Val Val Arg Met Leu Leu Gln Arg
20 25 30
gag ccc cgg ctc ggg gag ctg cgg gtc ttt gac caa cac ctg ggt ccc 144
Glu Pro Arg Leu Gly Glu Leu Arg Val Phe Asp Gln His Leu Gly Pro
35 40 45
tgg ctg gag gag ctg aag aca ggg cct gtg agg gtg act gcc atc cag 192
Trp Leu Glu Glu Leu Lys Thr Gly Pro Val Arg Val Thr Ala Ile Gln
50 55 60
ggg gac gtg acc cag gcc cat gag gtg gca gca gct gtg gcc gga gcc 240
Gly Asp Val Thr Gln Ala His Glu Val Ala Ala Ala Val Ala Gly Ala
65 70 75 80
cat gtg gtc atc cac acg gct ggg ctg gta gac gtg ttt ggc agg gcc 288
His Val Val Ile His Thr Ala Gly Leu Val Asp Val Phe Gly Arg Ala
85 90 95
agt ccc aag acc atc cat gag gtc aac gtg cag ggt acc cgg aac gtg 336
Ser Pro Lys Thr Ile His Glu Val Asn Val Gln Gly Thr Arg Asn Val
100 105 110

- 20 -

atc gag gct tgt gtg cag acc gga aca cgg ttc ctg gtc tac acc agc 384
 Ile Glu Ala Cys Val Gln Thr Gly Thr Arg Phe Leu Val Tyr Thr Ser
 115 120 125

agc atg gaa gtt gtg ggg cct aac acc aaa ggt cac ccc ttc tac agg 432
 Ser Met Glu Val Val Gly Pro Asn Thr Lys Gly His Pro Phe Tyr Arg
 130 135 140

ggc aac gaa gac acc cca tac gaa gca gtg cac agg cac ccc tat cct 480
 Gly Asn Glu Asp Thr Pro Tyr Glu Ala Val His Arg His Pro Tyr Pro
 145 150 155 160

tgc agc aag gcc ctg gcc gag tgg ctg gtc ctg gag gcc aac ggg agg 528
 Cys Ser Lys Ala Leu Ala Glu Trp Leu Val Leu Glu Ala Asn Gly Arg
 165 170 175

aag gtc cgt ggg ggg ctg ccc ctg gtg acg tgt gcc ctt cgt ccc acg 576
 Lys Val Arg Gly Gly Leu Pro Leu Val Thr Cys Ala Leu Arg Pro Thr
 180 185 190

ggc atc tac ggt gaa ggc cac cag atc atg agg gac ttc tac cgc cag 624
 Gly Ile Tyr Gly Glu Gly His Gln Ile Met Arg Asp Phe Tyr Arg Gln
 195 200 205

ggc ctg cgc ctg gga ggt tgg ctc ttc cgg gcc atc ccg gcc tct gtg 672
 Gly Leu Arg Leu Gly Gly Trp Leu Phe Arg Ala Ile Pro Ala Ser Val
 210 215 220

gag cat ggc cgg gtc tat gtg ggc aat gtt gcc tgg atg cac gtg ctg 720
 Glu His Gly Arg Val Tyr Val Gly Asn Val Ala Trp Met His Val Leu
 225 230 235 240

gca gcc cgg gag ctg gag cag cgg gca gcc ctg atg ggc ggc cag gta 768
 Ala Ala Arg Glu Leu Glu Gln Arg Ala Ala Leu Met Gly Gly Gln Val
 245 250 255

tac ttc tgc tac gat gga tca ccc tac agg agc tac gag gat ttc aac 816
 Tyr Phe Cys Tyr Asp Gly Ser Pro Tyr Arg Ser Tyr Glu Asp Phe Asn
 260 265 270

atg gag ttc ctg ggc ccc tgc gga ctg cgg ctg gtg ggc gcc cgc cca 864
 Met Glu Phe Leu Gly Pro Cys Gly Leu Arg Leu Val Gly Ala Arg Pro
 275 280 285

ttg ctg ccc tac tgg ctg ctg gtg ttc ctg gct gcc ctc aat gcc ctg 912
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 290 295 300

ctg cag tgg ctg ctg cgg cca ctg gtg ctc tac gca ccc ctg ctg aac 960
 Leu Gln Trp Leu Leu Arg Pro Leu Val Leu Tyr Ala Pro Leu Leu Asn
 305 310 315 320

ccc tac acg ctg gcc gtg gcc aac acc acc ttc acc gtc agc acc gac 1008
 Pro Tyr Thr Leu Ala Val Ala Asn Thr Thr Phe Thr Val Ser Thr Asp
 325 330 335

aag gct cag cgc cat ttc ggc tat gag ccc ctg ttc tcg tgg gag gat 1056
 Lys Ala Gln Arg His Phe Gly Tyr Glu Pro Leu Phe Ser Trp Glu Asp
 340 345 350

gct gtg ctt gag acc aac ctg acg ggt acc ttc tac atg tgc aaa gca 540
Ala Val Leu Glu Thr Asn Leu Thr Gly Thr Phe Tyr Met Cys Lys Ala
145 150 155 160

- 22 -

gtt tac agc tcc tgg atg aaa gag cat gga gga tct atc gtc aat atc 588
Val Tyr Ser Ser Trp Met Lys Glu His Gly Gly Ser Ile Val Asn Ile
165 170 175

att gtc cct act aaa gct gga ttt cca tta gct gtg cat tct gga gct 636
Ile Val Pro Thr Lys Ala Gly Phe Pro Leu Ala Val His Ser Gly Ala
180 185 190

gca aga gca ggt gtt tac aac ctc acc aaa tct tta gct ttg gaa tgg 684
Ala Arg Ala Gly Val Tyr Asn Leu Thr Lys Ser Leu Ala Leu Glu Trp
195 200 205

gcc tgc agt gga ata cgg atc aat tgt gtt gcc cct gga gtt att tat 732
Ala Cys Ser Gly Ile Arg Ile Asn Cys Val Ala Pro Gly Val Ile Tyr
210 215 220

tcc cag act gct gtg gag aac tat ggt tcc tgg gga caa agc ttc ttt 780
Ser Gln Thr Ala Val Glu Asn Tyr Gly Ser Trp Gly Gln Ser Phe Phe
225 230 235 240

gaa ggg tct ttt cag aaa atc ccc gct aaa cga att ggt gtt cct gag 828
Glu Gly Ser Phe Gln Lys Ile Pro Ala Lys Arg Ile Gly Val Pro Glu
245 250 255

gag gtc tcc tct gtg gtc tgc ttc cta ctg tct cct gca gct tcc ttc 876
Glu Val Ser Ser Val Val Cys Phe Leu Leu Ser Pro Ala Ala Ser Phe
260 265 270

atc act gga cag tcg gtg gat gtg gat ggg ggc cgg agt ctc tat act 924
Ile Thr Gly Gln Ser Val Asp Val Asp Gly Gly Arg Ser Leu Tyr Thr
275 280 285

cac tcg tat gag gta cca gat cat gac aac tgg ccc aag gga gca ggg 972
His Ser Tyr Glu Val Pro Asp His Asp Asn Trp Pro Lys Gly Ala Gly
290 295 300

gac ctt tct gtt gtc aaa aag atg aag gag acc tta aag gag aaa gct 1020
Asp Leu Ser Val Val Lys Lys Met Lys Glu Thr Leu Lys Glu Lys Ala
305 310 315 320

aag ctc tgagctgagg aaacaagggtg tcctccatcc ccagtgccctt cacatcttga 1076
Lys Leu

ggatatgctt ctgtactttt taaaagctta tagttggat ggaaaacatt tttcttattt 1136

ttaagtgtta ttaattatat ctatggaaaa actattcctg aaatatatac agtcttatgt 1196

ccccaaaaaa aaa 1209

<210> 11
<211> 322
<212> PRT
<213> Homo sapiens

<400> 11
Met Ser Leu Arg Pro Arg Arg Ala Cys Ala Gln Leu Leu Trp His Pro
1 5 10 15

Ala Ala Gly Met Ala Ser Trp Ala Lys Gly Arg Ser Tyr Leu Ala Pro
20 25 30

[illegible]

- 24 -

<210> 12
 <211> 966
 <212> DNA
 <213> Homo sapiens

<220>
 <221> CDS
 <222> (1)..(966)

<400> 12
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 Met Ser Leu Arg Pro Arg Arg Ala Cys Ala Gln Leu Leu Trp His Pro
 1 5 10 15

gct gca ggg atg gcc tcc tgg gct aag ggc agg agc tac ctg gcg cct 96
 Ala Ala Gly Met Ala Ser Trp Ala Lys Gly Arg Ser Tyr Leu Ala Pro
 20 25 30

ggt ttg ctg cag ggc caa gtg gcc atc gtc acc ggc ggg gcc acg ggc 144
 Gly Leu Leu Gln Gly Gln Val Ala Ile Val Thr Gly Gly Ala Thr Gly
 35 40 45

atc gga aaa gcc atc gtg aag gag ctc ctg gag ctg ggg agt aat gtg 192
 Ile Gly Lys Ala Ile Val Lys Glu Leu Leu Glu Leu Gly Ser Asn Val
 50 55 60

gtc att gca tcc cgt aag ttg gag aga ttg aag tct gcg gca gat gaa 240
 Val Ile Ala Ser Arg Lys Leu Glu Arg Leu Lys Ser Ala Ala Asp Glu
 65 70 75 80

ctg cag gcc aac cta cct ccc aca aag cag gca cga gtc att ccc ata 288
 Leu Gln Ala Asn Leu Pro Pro Thr Lys Gln Ala Arg Val Ile Pro Ile
 85 90 95

caa tgc aac atc cgg aat gag gag gag gtg aat aat ttg gtc aaa tct 336
 Gln Cys Asn Ile Arg Asn Glu Glu Glu Val Asn Asn Leu Val Lys Ser
 100 105 110

acc tta gat act ttt ggt aag atc aat ttc ttg gtg aac aat gga gga 384
 Thr Leu Asp Thr Phe Gly Lys Ile Asn Phe Leu Val Asn Asn Gly Gly
 115 120 125

ggc cag ttt ctt tcc cct gct gaa cac atc agt tct aag gga tgg cac 432
 Gly Gln Phe Leu Ser Pro Ala Glu His Ile Ser Ser Lys Gly Trp His
 130 135 140

gct gtg ctt gag acc aac ctg acg ggt acc ttc tac atg tgc aaa gca 480
 Ala Val Leu Glu Thr Asn Leu Thr Gly Thr Phe Tyr Met Cys Lys Ala
 145 150 155 160

gtt tac agc tcc tgg atg aaa gag cat gga gga tct atc gtc aat atc 528
 Val Tyr Ser Ser Trp Met Lys Glu His Gly Gly Ser Ile Val Asn Ile
 165 170 175

att gtc cct act aaa gct gga ttt cca tta gct gtg cat tct gga gct 576
 Ile Val Pro Thr Lys Ala Gly Phe Pro Leu Ala Val His Ser Gly Ala
 180 185 190

gca aga gca ggt gtt tac aac ctc acc aaa tct tta gct ttg gaa tgg 624
 Ala Arg Ala Gly Val Tyr Asn Leu Thr Lys Ser Leu Ala Leu Glu Trp
 195 200 205

gcc tgc agt gga ata cgg atc aat tgt gtt gcc cct gga gtt att tat 672
Ala Cys Ser Gly Ile Arg Ile Asn Cys Val Ala Pro Gly Val Ile Tyr
210 215 220

tcc cag act gct gtg gag aac tat ggt tcc tgg gga caa agc ttc ttt 720
Ser Gln Thr Ala Val Glu Asn Tyr Gly Ser Trp Gly Gln Ser Phe Phe
225 230 235 240

gaa ggg tct ttt cag aaa atc ccc gct aaa cga att ggt gtt cct gag 768
Glu Gly Ser Phe Gln Lys Ile Pro Ala Lys Arg Ile Gly Val Pro Glu
245 250 255

gag gtc tcc tct gtg gtc tgc ttc cta ctg tct cct gca gct tcc ttc 816
Glu Val Ser Ser Val Val Cys Phe Leu Leu Ser Pro Ala Ala Ser Phe
260 265 270

atc act gga cag tcg gtg gat gtg gat ggg ggc cgg agt ctc tat act 864
Ile Thr Gly Gln Ser Val Asp Val Asp Gly Gly Arg Ser Leu Tyr Thr
275 280 285

cac tcg tat gag gta cca gat cat gac aac tgg ccc aag gga gca ggg 912
His Ser Tyr Glu Val Pro Asp His Asp Asn Trp Pro Lys Gly Ala Gly
290 295 300

gac ctt tct gtt gtc aaa aag atg aag gag acc tta aag gag aaa gct 960
Asp Leu Ser Val Val Lys Lys Met Lys Glu Thr Leu Lys Glu Lys Ala
305 310 315 320

aag ctc 966
Lys Leu

<210> 13
<211> 303
<212> PRT
<213> Rattus norvegicus

<400> 13
Met Gly Ser Trp Lys Ser Gly Gln Ser Tyr Leu Ala Ala Gly Leu Leu
1 5 10 15

Gln Asn Gln Val Ala Val Val Thr Gly Gly Ala Thr Gly Ile Gly Lys
20 25 30

Ala Ile Ser Arg Glu Leu Leu His Leu Gly Cys Asn Val Val Ile Ala
35 40 45

Ser Arg Lys Leu Asp Arg Leu Thr Ala Ala Val Asp Glu Leu Arg Ala
50 55 60

Ser Gln Pro Pro Ser Ser Ser Thr Gln Val Thr Ala Ile Gln Cys Asn
65 70 75 80

Ile Arg Lys Glu Glu Glu Val Asn Asn Leu Val Lys Ser Thr Leu Ala
85 90 95

Lys Tyr Gly Lys Ile Asn Phe Leu Val Asn Asn Ala Gly Gly Gln Phe
100 105 110

- 26 -

Met Ala Pro Ala Glu Asp Ile Thr Ala Lys Gly Trp Gln Ala Val Ile
115 120 125

Glu Thr Asn Leu Thr Gly Thr Phe Tyr Met Cys Lys Ala Val Tyr Asn
130 135 140

Ser Trp Met Lys Asp His Gly Gly Ser Ile Val Asn Ile Ile Val Leu
145 150 155 160

Leu Asn Asn Gly Phe Pro Thr Ala Ala His Ser Gly Ala Ala Arg Ala
165 170 175

Gly Val Tyr Asn Leu Thr Lys Thr Met Ala Leu Thr Trp Ala Ser Ser
180 185 190

Gly Val Arg Ile Asn Cys Val Ala Pro Gly Thr Ile Tyr Ser Gln Thr
195 200 205

Ala Val Asp Asn Tyr Gly Glu Leu Gly Gln Thr Met Phe Glu Met Ala
210 215 220

Phe Glu Asn Ile Pro Ala Lys Arg Val Gly Leu Pro Glu Glu Ile Ser
225 230 235 240

Pro Leu Val Cys Phe Leu Leu Ser Pro Ala Ala Ser Phe Ile Thr Gly
245 250 255

Gln Leu Ile Asn Val Asp Gly Gly Gln Ala Leu Tyr Thr Arg Asn Phe
260 265 270

Thr Ile Pro Asp His Asp Asn Trp Pro Val Gly Ala Gly Asp Ser Ser
275 280 285

Phe Ile Lys Lys Val Lys Glu Ser Leu Lys Lys Gln Ala Arg Leu
290 295 300

<210> 14
<211> 1108
<212> DNA
<213> Mus musculus

<220>
<221> CDS
<222> (102)..(1034)

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caaagccaat cctttgtcat cccgctgtcc tgcagagcaa g atg ggg ctc atg gct 116
Met Gly Leu Met Ala
1 5

gtc ctg atg cta ccc ctg ctg ctg ctg gga atc agc ggc ctc ctc ttc 164
Val Leu Met Leu Pro Leu Leu Leu Leu Gly Ile Ser Gly Leu Leu Phe
10 15 20

att tac cag gag gca tcc agg ctg tgg tgc aag tct gcc gtg cag aac 212
Ile Tyr Gln Glu Ala Ser Arg Leu Trp Ser Lys Ser Ala Val Gln Asn
25 30 35

- 27 -

aaa gtg gtg gtc atc aca gat gcc atc tca gga ctg gga aag gag tgt 260
 Lys Val Val Val Ile Thr Asp Ala Ile Ser Gly Leu Gly Lys Glu Cys
 40 45 50

gct cgg gtg ttc cat gca ggt ggg gca agg ctg gtg ctg tgt gga aag 308
 Ala Arg Val Phe His Ala Gly Gly Ala Arg Leu Val Leu Cys Gly Lys
 55 60 65

aac tgg gag gga ctg gag agc ctc tat gcc acc ttg acc agt gtg gct 356
 Asn Trp Glu Gly Leu Glu Ser Leu Tyr Ala Thr Leu Thr Ser Val Ala
 70 75 80 85

gac ccc agc aag aca ttc acc ccc aag ctg gtc ctc ctg gat ctc tca 404
 Asp Pro Ser Lys Thr Phe Thr Pro Lys Leu Val Leu Leu Asp Leu Ser
 90 95 100

gac att agc tgt gtt caa gat gtg gcc aaa gag gtc ctg gac tgc tac 452
 Asp Ile Ser Cys Val Gln Asp Val Ala Lys Glu Val Leu Asp Cys Tyr
 105 110 115

ggc tgt gtg gac atc ctc atc aac aat gcc agc gtg aaa gtg aag ggg 500
 Gly Cys Val Asp Ile Leu Ile Asn Asn Ala Ser Val Lys Val Lys Gly
 120 125 130

cct gcc cac aag att tcc ctg gag ctt gac aaa aag atc atg gat gcc 548
 Pro Ala His Lys Ile Ser Leu Glu Leu Asp Lys Lys Ile Met Asp Ala
 135 140 145

aac tac ttc gga ccc atc act tta acc aaa gtt ctg ctt ccc aac atg 596
 Asn Tyr Phe Gly Pro Ile Thr Leu Thr Lys Val Leu Leu Pro Asn Met
 150 155 160 165

atc tcc agg aga aca ggc cag att gtg tta gtg aac aac atc caa gcg 644
 Ile Ser Arg Arg Thr Gly Gln Ile Val Leu Val Asn Asn Ile Gln Ala
 170 175 180

aag ttt gga atc ccg ttc cgc aca gct tat gca gcc tct aag cat gcc 692
 Lys Phe Gly Ile Pro Phe Arg Thr Ala Tyr Ala Ala Ser Lys His Ala
 185 190 195

gtc atg ggc ttc ttt gac tgc ctc cga gcc gag gtt gag gaa tac gat 740
 Val Met Gly Phe Phe Asp Cys Leu Arg Ala Glu Val Glu Glu Tyr Asp
 200 205 210

gtt gtg gtc agc acc gtg agc cca act ttc atc cgc tcc tac cgt gct 788
 Val Val Val Ser Thr Val Ser Pro Thr Phe Ile Arg Ser Tyr Arg Ala
 215 220 225

tcc cct gag caa aga aac tgg gag aca tcc att tgt aaa ttc ttc tgc 836
 Ser Pro Glu Gln Arg Asn Trp Glu Thr Ser Ile Cys Lys Phe Phe Cys
 230 235 240 245

agg aag cta gcc tat ggc gtg cac ccg gtg gag gtg gct gag gaa gtg 884
 Arg Lys Leu Ala Tyr Gly Val His Pro Val Glu Val Ala Glu Glu Val
 250 255 260

atg cgc aca gta cgg agg aag aag caa gag gtg ttc atg gcc aac ccg 932
 Met Arg Thr Val Arg Arg Lys Lys Gln Glu Val Phe Met Ala Asn Pro
 265 270 275

gtt	cct	aag	gct	gcc	gtg	ttc	atc	cgc	acc	ttc	ttc	cct	gag	ttc	ttc	980
Val	Pro	Lys	Ala	Ala	Val	Phe	Ile	Arg	Thr	Phe	Phe	Pro	Glu	Phe	Phe	
		280					285					290				
ttc	gct	gtg	gtg	gcc	tgt	ggg	gtg	aag	gag	aag	ctc	aat	gtc	cca	gaa	1028
Phe	Ala	Val	Val	Ala	Cys	Gly	Val	Lys	Glu	Lys	Leu	Asn	Val	Pro	Glu	
		295				300					305					
gag	ggt	taacctcgtg	gccaaagggg	tactcaagg	ggaataaagg	ctttcctaga	1084									
Glu	Gly															
310																
gaaaaaaaaa	aaaaaaaaaa	aaaaa	1108													

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<400> 15
Met Gly Leu Met Ala Val Leu Met Leu Pro Leu Leu Leu Leu Gly Ile
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Ser Gly Leu Leu Phe Ile Tyr Gln Glu Ala Ser Arg Leu Trp Ser Lys
      20                      25                      30

Ser Ala Val Gln Asn Lys Val Val Val Ile Thr Asp Ala Ile Ser Gly
      35                      40                      45

Leu Gly Lys Glu Cys Ala Arg Val Phe His Ala Gly Gly Ala Arg Leu
      50                      55                      60

Val Leu Cys Gly Lys Asn Trp Glu Gly Leu Glu Ser Leu Tyr Ala Thr
      65                      70                      75                      80

Leu Thr Ser Val Ala Asp Pro Ser Lys Thr Phe Thr Pro Lys Leu Val
      85                      90                      95

Leu Leu Asp Leu Ser Asp Ile Ser Cys Val Gln Asp Val Ala Lys Glu
      100                      105                      110

Val Leu Asp Cys Tyr Gly Cys Val Asp Ile Leu Ile Asn Asn Ala Ser
      115                      120                      125

Val Lys Val Lys Gly Pro Ala His Lys Ile Ser Leu Glu Leu Asp Lys
      130                      135                      140

Lys Ile Met Asp Ala Asn Tyr Phe Gly Pro Ile Thr Leu Thr Lys Val
      145                      150                      155                      160

Leu Leu Pro Asn Met Ile Ser Arg Arg Thr Gly Gln Ile Val Leu Val
      165                      170                      175

Asn Asn Ile Gln Ala Lys Phe Gly Ile Pro Phe Arg Thr Ala Tyr Ala
      180                      185                      190

Ala Ser Lys His Ala Val Met Gly Phe Phe Asp Cys Leu Arg Ala Glu
      195                      200                      205

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Val Glu Glu Tyr Asp Val Val Val Ser Thr Val Ser Pro Thr Phe Ile
 210 215 220

Arg Ser Tyr Arg Ala Ser Pro Glu Gln Arg Asn Trp Glu Thr Ser Ile
 225 230 235 240

Cys Lys Phe Phe Cys Arg Lys Leu Ala Tyr Gly Val His Pro Val Glu
 245 250 255

Val Ala Glu Glu Val Met Arg Thr Val Arg Arg Lys Lys Gln Glu Val
 260 265 270

Phe Met Ala Asn Pro Val Pro Lys Ala Ala Val Phe Ile Arg Thr Phe
 275 280 285

Phe Pro Glu Phe Phe Phe Ala Val Val Ala Cys Gly Val Lys Glu Lys
 290 295 300

Leu Asn Val Pro Glu Glu Gly
 305 310

<210> 16
 <211> 933
 <212> DNA
 <213> Mus musculus

<220>
 <221> CDS
 <222> (1)..(933)

<400> 16
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 Met Gly Leu Met Ala Val Leu Met Leu Pro Leu Leu Leu Leu Gly Ile
 1 5 10 15

agc ggc ctc ctc ttc att tac cag gag gca tcc agg ctg tgg tcg aag 96
 Ser Gly Leu Leu Phe Ile Tyr Gln Glu Ala Ser Arg Leu Trp Ser Lys
 20 25 30

tct gcc gtg cag aac aaa gtg gtg gtc atc aca gat gcc atc tca gga 144
 Ser Ala Val Gln Asn Lys Val Val Val Ile Thr Asp Ala Ile Ser Gly
 35 40 45

ctg gga aag gag tgt gct cgg gtg ttc cat gca ggt ggg gca agg ctg 192
 Leu Gly Lys Glu Cys Ala Arg Val Phe His Ala Gly Gly Ala Arg Leu
 50 55 60

gtg ctg tgt gga aag aac tgg gag gga ctg gag agc ctc tat gcc acc 240
 Val Leu Cys Gly Lys Asn Trp Glu Gly Leu Glu Ser Leu Tyr Ala Thr
 65 70 75 80

ttg acc agt gtg gct gac ccc agc aag aca ttc acc ccc aag ctg gtc 288
 Leu Thr Ser Val Ala Asp Pro Ser Lys Thr Phe Thr Pro Lys Leu Val
 85 90 95

ctc ctg gat ctc tca gac att agc tgt gtt caa gat gtg gcc aaa gag 336
 Leu Leu Asp Leu Ser Asp Ile Ser Cys Val Gln Asp Val Ala Lys Glu
 100 105 110

- 30 -

gtc ctg gac tgc tac ggc tgt gtg gac atc ctc atc aac aat gcc agc	384
Val Leu Asp Cys Tyr Gly Cys Val Asp Ile Leu Ile Asn Asn Ala Ser	
115 120 125	
gtg aaa gtg aag ggg cct gcc cac aag att tcc ctg gag ctt gac aaa	432
Val Lys Val Lys Gly Pro Ala His Lys Ile Ser Leu Glu Leu Asp Lys	
130 135 140	
aag atc atg gat gcc aac tac ttc gga ccc atc act tta acc aaa gtt	480
Lys Ile Met Asp Ala Asn Tyr Phe Gly Pro Ile Thr Leu Thr Lys Val	
145 150 155 160	
ctg ctt ccc aac atg atc tcc agg aga aca ggc cag att gtg tta gtg	528
Leu Leu Pro Asn Met Ile Ser Arg Arg Thr Gly Gln Ile Val Leu Val	
165 170 175	
aac aac atc caa gcg aag ttt gga atc ccg ttc cgc aca gct tat gca	576
Asn Asn Ile Gln Ala Lys Phe Gly Ile Pro Phe Arg Thr Ala Tyr Ala	
180 185 190	
gcc tct aag cat gcc gtc atg ggc ttc ttt gac tgc ctc cga gcc gag	624
Ala Ser Lys His Ala Val Met Gly Phe Phe Asp Cys Leu Arg Ala Glu	
195 200 205	
gtt gag gaa tac gat gtt gtg gtc agc acc gtg agc cca act ttc atc	672
Val Glu Glu Tyr Asp Val Val Val Ser Thr Val Ser Pro Thr Phe Ile	
210 215 220	
cgc tcc tac cgt gct tcc cct gag caa aga aac tgg gag aca tcc att	720
Arg Ser Tyr Arg Ala Ser Pro Glu Gln Arg Asn Trp Glu Thr Ser Ile	
225 230 235 240	
tgt aaa ttc ttc tgc agg aag cta gcc tat ggc gtg cac ccg gtg gag	768
Cys Lys Phe Phe Cys Arg Lys Leu Ala Tyr Gly Val His Pro Val Glu	
245 250 255	
gtg gct gag gaa gtg atg cgc aca gta cgg agg aag aag caa gag gtg	816
Val Ala Glu Glu Val Met Arg Thr Val Arg Arg Lys Lys Gln Glu Val	
260 265 270	
ttc atg gcc aac ccg gtt cct aag gct gcc gtg ttc atc cgc acc ttc	864
Phe Met Ala Asn Pro Val Pro Lys Ala Ala Val Phe Ile Arg Thr Phe	
275 280 285	
ttc cct gag ttc ttc ttc gct gtg gtg gcc tgt ggg gtg aag gag aag	912
Phe Pro Glu Phe Phe Phe Ala Val Val Ala Cys Gly Val Lys Glu Lys	
290 295 300	
ctc aat gtc cca gaa gag ggt	933
Leu Asn Val Pro Glu Glu Gly	
305 310	